



Avian Influenza & DoD Pandemic Planning

LTC Wayne Hachey

Director Deployment Medicine & Surveillance

Office of the Assistant Secretary of Defense (Health Affairs)

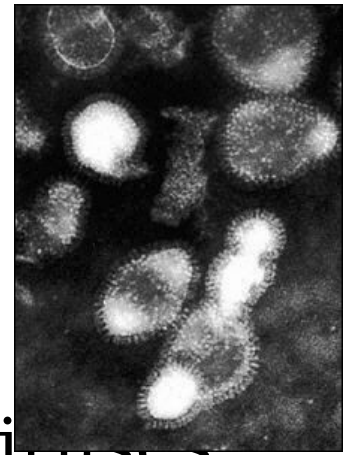


Agenda



- Avian influenza –20 minutes
 - Type A influenza
 - Avian influenza
 - Threat
- DoD planning – 20 minutes
 - Goals
 - Preparedness
 - Strategy
 - Current initiatives

Influenza A Viruses



- Single-stranded segmented RNA viruses
- Rapid change by mutations (antigenic drift) and exchange of gene segments (antigenic shift or reassortment)
- Found in a wide variety of avian and mammalian species (human, pigs, horses)
- Waterfowl (geese, ducks, gulls etc) probably the natural hosts (fowl plague described in 1878)

Influenza A & People

- Yearly outbreak – 36,000 deaths in US
- Pandemic strains with novel surface protein have/can cause significant increases in illness and death
- 1918 Spanish (AKA Kansas) flu pandemic killed 50,000,000 (765,000 in US) most likely an avian flu that adapted without reassortment.
 - “W” shaped mortality curve may have been due to prior exposure to 1889 pandemic. Underestimation of projected deaths using 1918 as a model. (H1N1)
 - WWI: US had approximately 100,000 casualties; Almost half died of influenza
- Other two pandemics in 1957 & 68 result of reassortment (H2N2 & H3N2)

Avian Influenza

- Diverse group of influenza A viruses infecting wild and domestic birds
- 16 hemagglutinin & 9 neuraminidase serotypes = 144 possible combinations
- Can affect avian GI or respiratory tracts
- Usually low path (mild or no symptoms)
- High path is a domestic poultry disease (only H5 or H7 - allows systemic replication in birds)

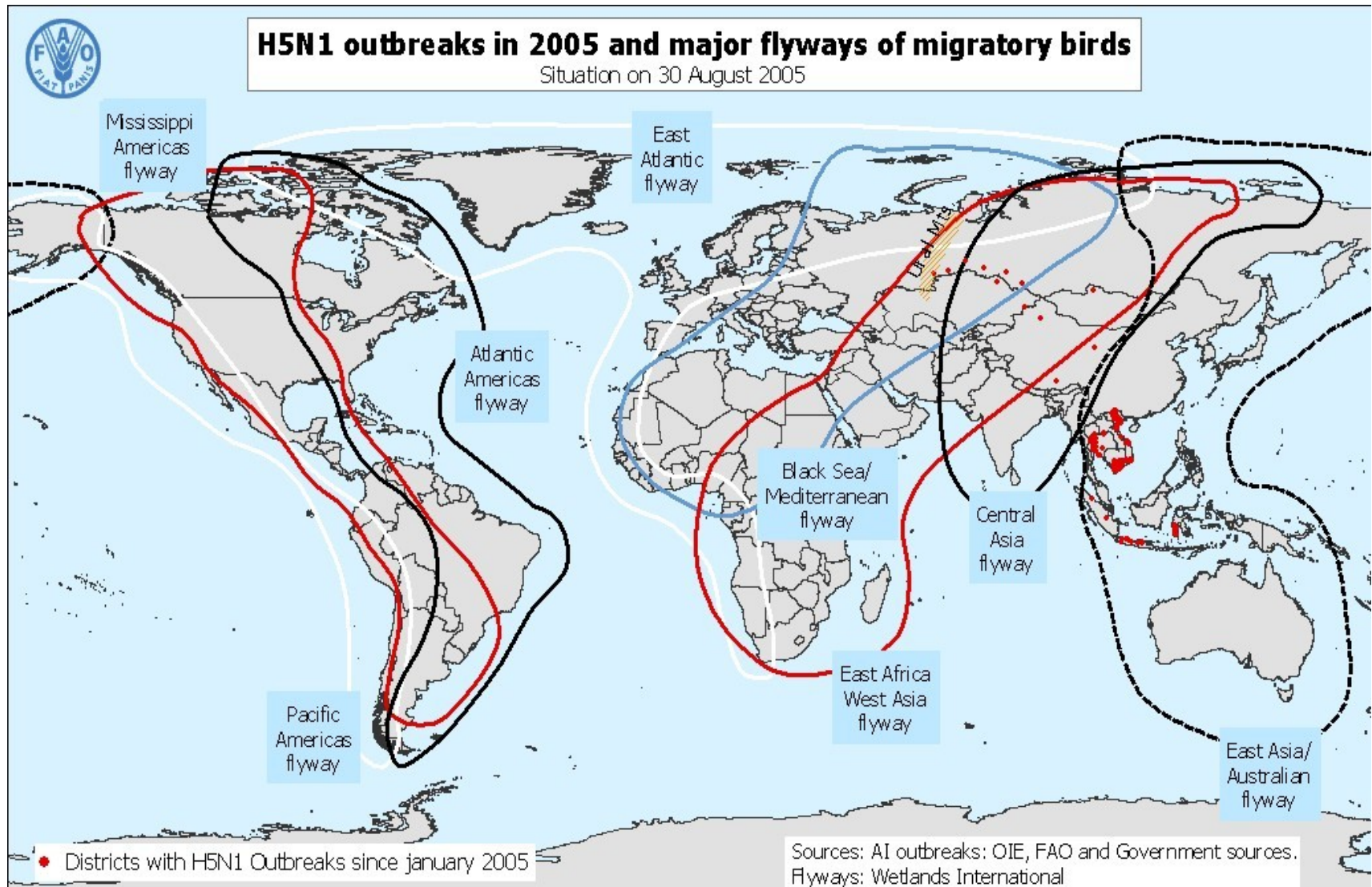
Avian Flu – Recent High Path Outbreaks

- 1997 Hong Kong: 18 infected, 6 dead, 1.5 million chickens dead, 10's of millions slaughtered (H5N1)
- 2003 northern Europe: 90 infected, 1 death, millions of poultry slaughtered (H7N7)
- 2003-5 SE Asia: over the past 2 years 114 infected,* 59 dead,* >150 million domestic and wild birds
 - Tigers and people have died after feeding on dead carcasses (H5N1)
- 2004 British Columbia: 2 infected, 0 deaths, 19 million birds slaughtered (H7N3)

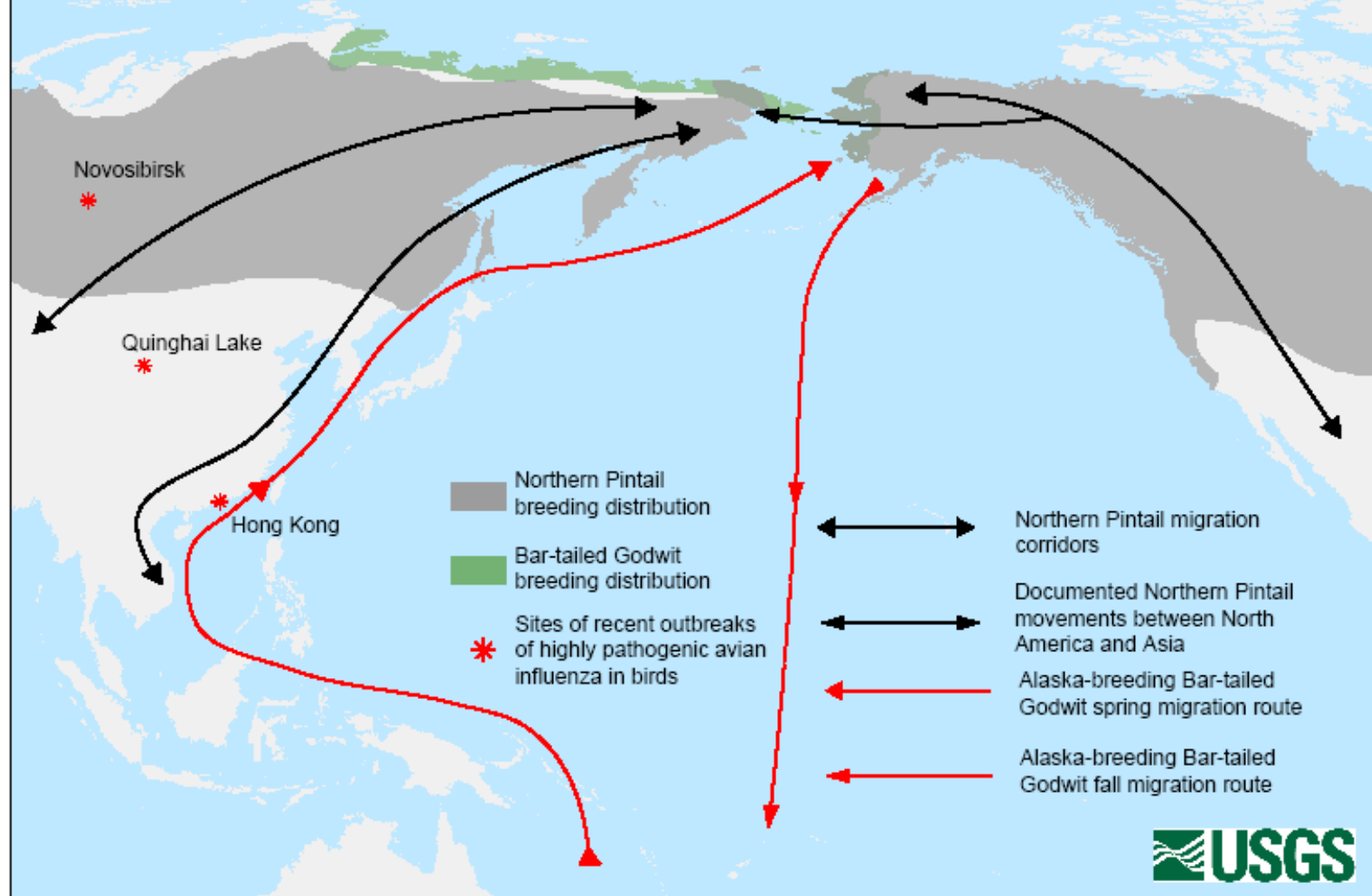
H5N1

- H5N1 viruses genetically not the same as the 1997 outbreak
- Human infections have generally been associated with massive doses of virus
- H5N1 spreading out of SE Asia possibly by migrating birds
 - Birds ill with virus most likely dead and not able to act as carriers

Where the Birds Are



Potential Pathways of Avian Influenza Introduction from Asia to North America



Are the flyways a risk or much to do about nothing?

- August 25- Chief veterinary officials from the European Commission concluded that because further information was necessary in order to implicate migratory birds, the immediate risk of these birds introducing avian flu to the European Union was remote.
- However, a director in the United Nations Food and Agriculture Organization expressed an opposing view.

Should we be blaming wild birds?

- Recent outbreak in Russia
 - PCR of waterfowl and domestic poultry different
- Recent outbreak in Mongolia
 - Large bird die-off
 - Wildlife Conservation Society funded by FAO
 - 800 samples sent - ONE Positive
 - Deaths not due to AI - AI probable incidental finding



Should we be blaming wild birds?

- Northern Kazakhstan
 - Outbreak of AI
 - Pattern did not correspond to migration patterns
 - Pattern DID correspond to trade route strongly suggesting spread is due to smuggled poultry.
- Alaska
 - From 1998-2005 over 12,000 samples from wild birds evaluated for influenza viruses. No H5N1 to date.



Where is
the real
Risk?



Is H5N1 the Next Pandemic Strain

- No current evidence that the virus is adapting to humans
- Reassortment is possible but pandemic risk is unknown
- Adaptation without reassortment is possible – need 40 base pair changes
- No historical precedent for High Path AI initiating a pandemic (all known pandemics of H1,2&3 subtypes were from Low Path AI) but historical perspective is limited
- Can H5 viruses get there from here? (biological barrier to adaptation to humans)

AI Pandemic Problems

- Naïve global population
- Limited global vaccine capacity <500M
 - Will require a priming and booster dose
- Limited global anti-viral capacity
 - Some neuraminidase inhibitors effective in prophylaxis and treatment (Tamiflu)
 - Amantadines - limited use due to resistance already demonstrated for H5N1 viruses

Current Threat

- H5N1 is now endemic in southeast Asia
 - Expanded in Siberia and spread to Mongolia and Kazakhstan - Primarily an avian disease
 - Some have expressed concern that flyways may spread disease to Europe and North America
- Bird-to-swine and bird-to-human transmission confirmed
- No confirmed human to human transmission (no pig to pig transmission in lab but domestic cat transmits disease easily to other cats)
- Genetic drift or shift resulting in human-to-human transmission considered by some to be inevitable

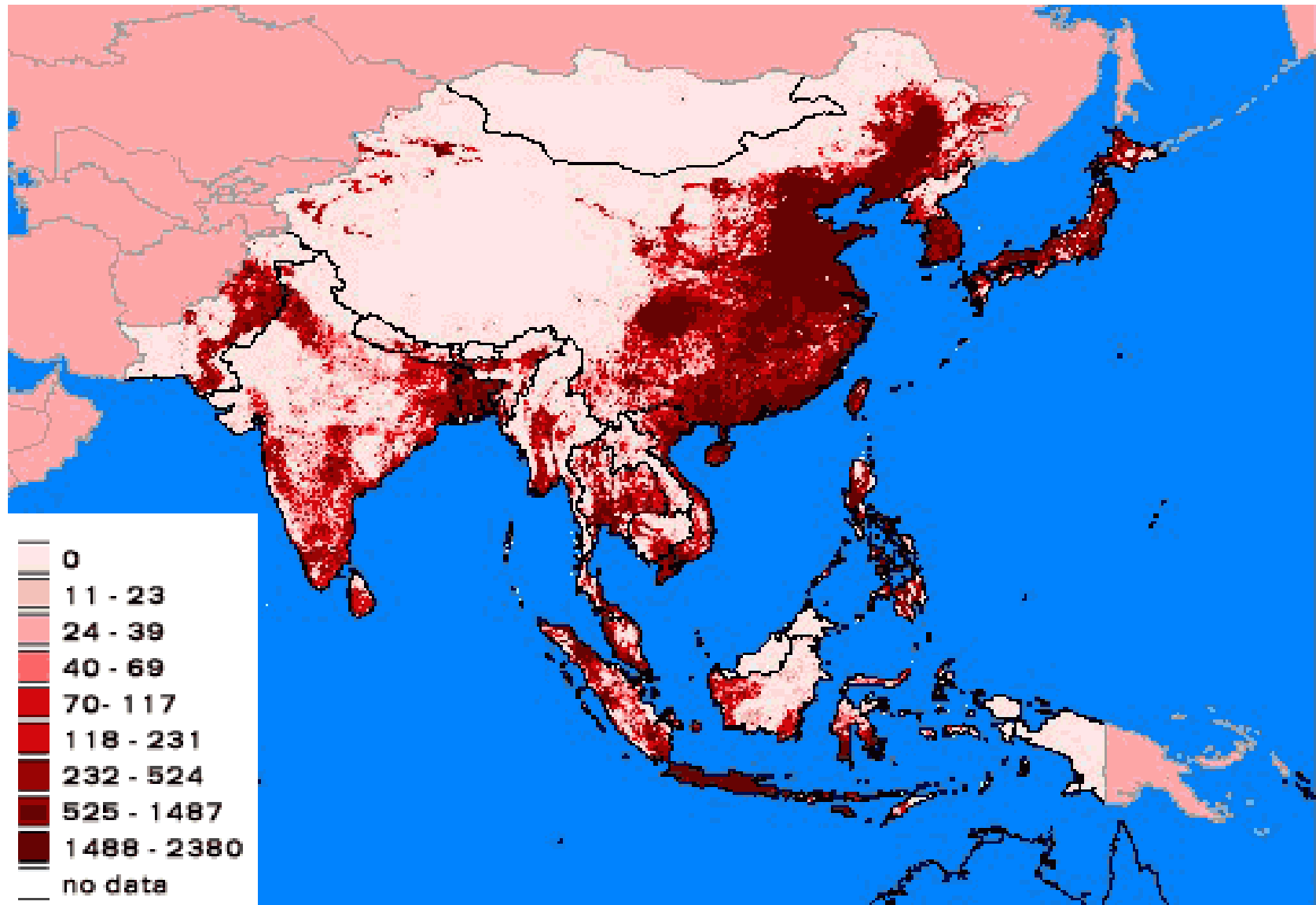
Current Threat

SE Asia Containment Problems

- 75-80% poultry farms are small backyard operations - limits biosecurity
- Numerous endemic viruses resulting in 50-70% baseline poultry deaths
- Multiple disincentives to report a die-off
- Most SE Asian countries lack a comprehensive public health plan for AI
- Poor public health/civil services infrastructure
 - Indonesia unable to control spread by culling
- Low degree of buy-in from leadership



DENSITY OF POULTRY IN SOUTH-EAST ASIA



DoD AI Pandemic Planning



DoD Goals

- Preserve ability to provide for National Defense
 - Protect the Total Force from Avian Influenza
 - Conduct aggressive global surveillance
 - Educate Total Force, Beneficiaries and Providers
 - Prevention
 - Containment measures
 - Treatment

Preparedness Categories

- Planning and coordination
- Situation monitoring and assessment
- Prevention and containment
- Health system response
- Communications

Planning and Coordination

- DoD has actively participated in an interagency global pandemic influenza planning process
 - Emphasis on surveillance and early containment
- The Department of Health and Human Services has released its pandemic influenza response plan
 - The DoD has submitted comments to this plan in areas that affect us (supportive role)
- DoD pandemic influenza plan in place since 2004
 - Variable degrees of readiness at installation level
 - PACOM completed CONPLAN - other CoCOMS to follow

Planning and Coordination

- Supporting Plans
 - Commanders include preparation in medical and non-medical contingency planning
 - Address out-of-season immunization clinic
 - Immunization tracking systems
 - Medical triage
 - Expand provision of medical care
 - Combatant Commands develop and exercise DoD- specific contingency plans (PACOM table-top)
 - DoD coordinates with WHO, HHS, allies on pandemic planning

DoD Pandemic Plan Training Instruction

- Training
 - Commanders schedule, conduct and evaluate training.
 - Military medical departments will train providers in special surveillance, control measures, immunization, chemoprophylaxis and chemotherapy of influenza.

Situation Monitoring and Assessment

- Current surveillance efforts ensure the earliest possible detection of an emerging pandemic
 - When a novel strain of influenza is identified, enhanced surveillance will be instituted
 - Surveillance will be further enhanced and extended following confirmation of human to human transmission

The DoD Worldwide Influenza Surveillance Program

- Laboratory based influenza surveillance program
 - Goals:
 - Detect local respiratory outbreaks
 - Provide isolates to the World Health Association (WHO) and CDC
 - Detect emerging strains
 - 19 sentinel bases (9 stateside, 3 Europe, 7 Asia)
 - Sites also located at Lima, Peru, a travel clinic in Nepal, and the Kwai River Christian Hospital on the Thai-Burmese border.

DoD-GEIS

Global Emerging Infections System

- Leverages the surveillance and response assets of a network of DoD service hubs and overseas medical research units
- Participates in a consortium that includes the US Army Center for Health Promotion and Preventive Medicine, the US Army Medical Research Institute of Infectious Diseases, and the Naval Environmental Health Center
- Established strong working relationships with the U.S. CDC and international health agencies
- GEIS is a partner in the World Health Organization's Global Outbreak Alert and Response Network

GEIS Hubs

- Air Force General Surveillance Office, Brooks Air Force Base, TX
- NAMRU-2 Indonesia
- NAMRU-3 Egypt
- USAMRU-K Kenya
- NAMRID Peru
- AFRIMS Thailand
- NHRC San Diego

ESSENCE: Electronic Surveillance System for the Early Notification of Community-Based Epidemics

- Collect data from all TMA MTFs worldwide. At present, this includes data from 121 Army, 110 Navy, 80 Air Force and 2 Coast Guard installations. Data is provided within approximately 3 days from the patient encounter
- Similar ICD-9-CM codes are grouped together in seven syndromes that best represent presenting signs, symptoms, and diagnoses
 - By establishing baseline levels of these seven groups, fluctuations in the groups can be monitored on a daily basis and significant increases can be detected through data analysis

Early Pandemic

- Secretary, Department of Health and Human Services (HHS) notifies Secretary of Defense and Assistant Secretary of Defense for Health Affairs
 - Notify Joint Staff and Surgeons General
 - Commanders notified via command channels
- Due to GEIS and ESSENCE and interactions with CDC and WHO, DoD is likely to be aware of pandemic before HHS.

Containment

- Early containment measures would be initiated by local governments assisted by DoS, USAID, DoD.
- Once an influenza pandemic outbreak is confirmed
 - Joint staff or combatant commanders will provide strategic forces with instructions to implement available medical and non-medical countermeasures (anti-virals, quarantine, close schools, restrict movement, reinforce hand washing, PPE....)

Operational priorities

- Maintain operational and medical readiness
 - Immunization/chemoprophylaxis of deployed forces
 - Immunization/chemoprophylaxis of non-deployed forces who are on alert or designated to conduct contingency operations
 - Immunization/chemoprophylaxis of all other active duty personnel and critical civilian support
- Preparation of MTF to provide mass immunization and to care for large numbers of patients
- Immunization/chemoprophylaxis of other beneficiaries
- Risk communication with beneficiaries

Health System Response

- The DoD will provide administrative and medical responses to minimize operational impact through vaccination of targeted subpopulations
- Deployed forces, especially those engaged in armed conflict, would receive priority for preventive and supportive medical care resources

Health System Response

- Following pandemic confirmation, antiviral stockpiles would be eligible for release
 - 2 million treatment courses of Tamiflu available (delivery to begin Nov 05)
 - Stockpiled for CONUS, PACOM, CENTCOM
 - Prophylaxis for 350,000 front line and critical HQ and HC personnel
 - 17,000 treatment courses for OCONUS beneficiaries
 - 500,000 treatment courses in reserve

Health System Response Vaccine

- Avian influenza (H5N1) vaccine not available at least until 2006
 - Clinical trials promising but early
 - Necessary dose larger than originally anticipated - limiting supply
- After determination of pandemic specific H5N1 strain, flu vaccine will not be available for approximately 6 months
- Naïve population will require two doses
- Initial supply will be severely limited
 - National output at best 2 million/week
- Syringe and needle shortage likely

Communication

- Local commanders will designate an influenza coordination cell to coordinate the DoD response and provide a focal liaison with DoD, other federal and local response coordinators
- Local commanders will evaluate and report the operational impact of the disease
- MTF's report on the medical impact of the disease (response to therapy, supply and staffing)
- The military vaccine agency will facilitate transmission of these reports through chain of command

Potential Strategies

- Obtain generic H5N1 vaccine when licensed and administer to troops before pandemic
 - Personnel will require one instead of two doses of the vaccine that is specific to the pandemic strain
 - May provide some interim protection prior to specific vaccine development and distribution
- Use of dose sparing syringe technology
 - Decreased dead space provides more vaccine for use
 - Stockpile of syringes will prevent inability to administer vaccine due to syringe shortages
 - CDC and other nations considering this strategy

Current DoD Strategy

- Enhance DoD's ability to support USG's domestic & AI programs:
 - First protect critical DoD force, then beneficiaries
 - Increased global capability and capacity to ID and report AI
 - Ability to contain outbreak projected globally
 - Improve allied military capability to prevent, track, report and respond to AI in their countries

Current DoD Strategy

Key Components - Countermeasures

- Acquire and pre-position antiviral treatment
 - 2 million treatment courses ordered
 - Requested an additional 700,000 treatment courses
- Acquire/administer pre-event vaccine for critical military forces and high risk DoD personnel

Current DoD Strategy

Key Components-Surveillance

- Enhance DoD global situational awareness
 - Connect disparate DoD surveillance activities
 - Standardize collection, reporting and analysis of information
- Support initial USG integration of medical intelligence within AFMIC

Current DoD Strategy

Key Components

Laboratory Capacity and Capability

- Expand DoD existing lab capacity and capability necessary for sampling, analysis and reporting
WHO
 - PCR
 - Diagnostic
 - Personnel



Current DoD Strategy

Key Components-Response

- Enhance capability for MTF and PHEO to respond to outbreaks
- Augment epidemiological teams to enhance surge capacity
- Assist CDC in identifying specific isolated viruses for use in building vaccine
- Complete CONOP's for response in all CoCOMS

Current DoD Strategy

Key Components

Military to Military Capacity Building

- Work with PACRIM allied countries' militaries to expand their limited capability to prevent, identify, track, report, contain, respond to AI outbreaks

New Initiatives

AI work group established to determine:

- Current state of clinical readiness
 - Current capabilities and assets
 - Measures used to validate readiness
 - Current surveillance capabilities
 - Determine what additional measures might be necessary
 - Determine how clinical activities are integrated internally
 - How do DoD activities interface with other USG and NGO venues

New Initiatives

- Joint Health Surveillance Center Implementation Planning Task Force
 - Develop an implementation plan to organize existing and proposed DoD health surveillance capabilities to achieve comprehensive, continuous and consistent military health surveillance within the Armed Forces

New Initiatives

- DoD Avian Influenza website
 - Provides information and guidance to
 - Commanders
 - Providers
 - Beneficiaries

New Initiatives

- DoD AI communication group
 - Action officer level
 - Representatives from HA, JCS, Policy
 - Insure clear lines of communication regarding AI planning and response within DoD

Approved Supplemental OMB requests

- Tamiflu - 700,000 treatment courses
- Vaccine - 18 Million doses (divided over 2 years)
- Surveillance - \$40 Million to upgrade capabilities and surge capacity
- Military-to-Military capacity building
\$10 Million
- Education, PPE and dose sparing strategies not approved by OMB

